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ABSTRACT

A study was carried out to test the hypothesis that mothers' speech to eight-month-olds differs as a function of maternal age. The subjects were 10 adolescent (mean age 16.5) and 10 older (mean age 24.5 years) mothers, all lower to middle class, first-time mothers, and Caucasian. Each mother and child pair was videotaped in a laboratory setting--first, in three minutes of face-to-face interaction, second, in a teaching situation, and third, in three minutes of free play. The videotapes were transcribed and coded for structural complexity, length of turn, discourse role of the utterance, and number of utterances. Results from repeated analyses of variance demonstrated main effects for maternal age but no significant interactions between maternal age and situation, with adolescent mothers less responsive to their infants and using fewer utterances in all situations. Given the importance accorded to maternal contingency in the acquisition process, the results are consistent with the hypothesis that children of adolescent mothers may be at risk for language development. (MSE)

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Maternal Speech to Eight Month Old Infants: A Study of Adolescent and Older Mothers

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A number of studies during the past two decades have examined the nature of maternal input to young children. Researchers have documented differences in caregiver input based on cultural and social membership, the age and sex of the child, and the linguistic ability of the child.

The present study examines yet another factor which may determine the nature of caregiver input. This study tested the hypothesis that maternal speech differs as a function of the mothers' age. The two groups of mothers compared presumably share the same goals and motivations in their communicative requirements for their infants by virture of their membership in the same cultural domain. The groups of mothers were chosen primarily because of their difference in age. This study documents the nature of maternal input of older and adolescent mothers to their eight month old infants across three situations.

There is reason to suspect that the nature of maternal input of the two groups does in fact differ. Studies find that adolescent mothers have less verbal interaction with their infants, have a less realistic concept of the infant's abilities, and are less likely to use touching, high pitched voice and synchronous movements. To date, no one has specifically examined the linguistic aspects of the adolescent mother's interaction with her child. Nonetheless, the data which has been compiled so far regarding the general

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interactional strategies of teenage mothers with their infants suggest that adolescent mothers will be less interested in interacting with their infants and will be less aware of the infants' abilities as a communicator.

In predicting the nature of the differences in input between older and teenage mothers, the later linguistic abilities of children of adolescent mothers was considered. Research indicates that the children of adolescent mothers may be at risk for a language delay or a language deficit. Oppel and Royston (1971) find that these children have lower reading scores and are more likely to be held back in school. Fustenberg (1976), Brohman (1981) and Field et. al (1984) find that they perform poorly on standardardized tests when compared to children of older mothers. Unfortunately, no one has specifically examined the language capabilities of this group of children. Our own longitudinal data indicate that on a standardized language comprehension test (RITLS) and on the verbal subtests of other standardized tests (The Mullen, McCarthy) children of adolescent mothers have significantly lower scores than children of older mothers. Given the body of research citing the effects of maternal input on the acquisition process even during the prelinguistic stage, the apparent linguistic deficits of children of teenage mothers may be due to a different style of maternal input.

Insert Slide 1 about here

We hypothesized that adolescent mothers would use a style of input which is not as likely to foster language acquisition in comparison to the style older mothers use. This restricted style will be manifested in certain linguistic behaviors. Adolescent mother will have:

1. utterances which are more grammatically complex,
2. fewer utterances,
3. shorter 'conversational' turns,
4. and will be less communicatively responsive to their infants behaviors.

We further hypothesized that these differences would be exacerbated in a

teaching situation.

Insert Slide 2 about here

METHODOLOGY

This study considered the maternal input of 20 primiparous, Caucasian, lower to middle class mothers of full term, healthy infants. There were 10 adolescent mothers (mean age at birth of child =16.5, range 14 to 17) and 10 older mothers (mean age at birth of child = 24.5, range 21 to 29). Most of the adolescent mothers had not completed high school. Most of the older mothers had some post secondary education. Socioeconomic status, as measured by the Hollingshead Four Factor Index, averaged 26.1 for the adolescent mothers and 30.8 for the older mothers. This difference was not statistically significant.

When the infants were 8 months old, mothers brought them to the Brown University Child Study Center where each dyad was videotaped in three different communicative situations. We were investigating the possibility that the hypothesized differences in maternal input were situation specific. To this end the three situations were selected to elicit maximally different maternal scripts. In each case mother and child were videotaped through a one-way mirror. The first situation was 3 minutes of face-to-face interaction where the mother sat facing the infant who was in a high chair. A mirror was used to capture the mothers' facial expressions so both child and mother appeared on the videotape. Secondly, there was a teaching situation where the mother taught the child two advanced tasks from the Bayley Scales of Infant Development (dropping blocks in a cup and placing pegs in holes in a row on a board). The teaching situation was allowed to continue until the child succeeded in the task or the mother indicated that the child could not learn the task, whichever came first. Finally, there was a three minute free play situation with mother and child seated on the floor playing with a set of three experimenter provided toys.

DATA ANALYSIS

The tapes were transcribed and coded according to a set of maternal and infant variables presented in the next 2 slides and in the handout. The goal was to characterize the reciprocal patterns of communicative interaction between mother and child.

Insert Slide 3 about here.

The coding system defines for the infant those behaviors which are potentially communicative and notes the form of those behaviors as well as their role in the discourse structure. Infant behaviors were considered potentially communicative if there was eye contact with the mother combined with some other behavior such as a vocalization, a laugh or a gesture.

Insert Slide 4 about here.

For the mother, variables center around the degree of grammatical complexity measured roughly by MLU, ML5 and the number of main verbs per utterance, and the discourse role of the utterance. Intercoder reliability was established for both transcription and coding. Interrater reliability ranged between 82.6% and 97%, and averaged around 90%

Two (maternal age) by three (situation) repeated measures ANOVAS were run using each of the maternal coding variables as well as number of maternal utterances per turn and the overall number of maternal utterances as dependent variables. In addition, two new dependent variables were formed: 'Contingency', a combination of maternal responses and all the utterances coded as 'Continues Turn' which followed a response, and an overall 'Interaction' score where the contingency score was supplemented by the number of utterances coded as 'Simultaneous Interaction'. The figures used for 'Main Verbs' and all the discourse variables were computed as percentages of the total number of utterances. All other figures represent the raw numbers.

The data indicate that there was no interaction between maternal age and situation for any of the dependent variables. Thus, our last hypothesis that the differences in maternal input would be situation specific was not confirmed. There were, however, main effects for both maternal age and situation.

Insert Slide 5 about here.

The situational differences are reported in the next slide and in your handout. I don't wish to dwell on these as they are really quite predictable given the communicative agenda which would naturally be associated with each situation. For example, one would expect that the teaching situation would evoke more maternal control and thus the mother would have significantly more utterances, more initiations, and utterances would be more likely to be imperatives and thus there would be significantly more main verbs. This is indeed the case in our data. These findings are important, however, because they document that situational differences in maternal input do exist even with prelinguistic infants. Therefore, the situational constraints which shape mother's speech should be carefully considered in any study of mother-child interaction.

Insert Slide 6 about here.

With regard to the differences based on maternal age, the data which pertain to grammatical complexity will first be discussed. The only significant difference here is in ML5 where the older mothers had a significantly longer ML5. This finding does not confirm our original hypothesis that adolescent mothers would have more complex utterances than older mothers. In fact, the only significant difference in the three grammatical complexity measures went in the opposite direction from what we had predicted with <u>older</u> mothers having longer ML5s. We can conclude from this that either differences in grammatical complexity will not show up until the children are linguistically more sophisticated, or that, because of the mothers' membership in the same cultural and social groups, what

they say to their infants in terms of its syntactic complexity is not very different.

Insert Slide 7 about here.

The next slide presents the differences based on maternal age for the discourse variables. The main difference between the two groups was the percentage of the mothers' utterances which were contingent to the infants' behaviors, older mothers have significantly more contingent utterances. Note also that older mothers used significantly more utterances than the teenage mothers did and that there were no differences in the length of turns.

Insert Slide 8 about here.

In a subsequent exploratory analysis, stepwise multiple regressions were performed with maternal age, maternal education and SES as predictor variables. This was done to be sure that maternal age was the best predictor of the differences and not other demographic variables. The results are given in your handout and this slide. These data indicate that maternal age is the best predictor of maternal behaviors. With the exception of 'Initiations' where the younger the mother is the more initiations she is likely to have, the relationship between the dependent variable and the predictor variable is positive. That is, the older a mother is the more responsive she will be to the infant and the more utterances she will use.

DISCUSSION

Our initial assertion that adolescent mothers appear to be less aware of their infants as communicative partners would seem to be substantiated by this data. Adolescent mothers <u>are</u> interested in interacting with their infants as evidenced by a high percentage of initiations, an equal percentage of simultaneous interaction as older mothers, and consistent responses to infant initiations. It should be noted, however, that simultaneous interaction and responses to infant initiations account for less than 5% of the total interaction between mother and child. When they are not directly

involved in interaction the adolescent mother spends considerable time trying to draw the infant's attention through the use of vocatives, gestures such as clapping and sounds such as 'kissing noises'. These behaviors account for most of the teenage mothers' initiations. But the teenage mother only encourages her infant to interact with her socially, to respond to her initiations. Reciprocal interaction takes place only when it is emotionally gratifying for the teenage mother: when the infant gives her his undivided attention. The adolescent mother does not appear to consider the infant's behaviors communicative or meaningful in a linguistic sense.

Further evidence that the adolescent mother does not view her infant as a communicative partner in the same way that the older mother does comes from more detailed analysis of the contingency scores. The contingency score is comprised of two types of maternal behaviors. The mother can respond to the infant's direct initiations and, as mentioned before, there was no difference between adolescent and older mothers in the degree to which they do this. There was also no difference in the number of initiations by each group of infants, less than one per situation.

Insert Slide 9 about here.

The other type of contingent maternal behavior is when the mother imputes intentionality to the infant's behavior even when the infant does not intend the behavior to be communicative (in this study, when the infant does not have eye contact with the mother). Adolescent mothers impute intentionality an average of 7.4 times per situation whereas older mothers impute intentionality an average of 12.46 times per situation. This is significant at the $p<.001$ level. Thus the older mother clearly focuses on the infant's behaviors and encourages communicative interaction regardless of whether the infant gives the mother his attention.

In a 1979 study, Harding and Golinkoff suggest that the first evidence of intentional communication comes when an infant is about 10 months old. More relevent to this study, however, is the importance that these authors

accord to the imputing of intentionality by mothers prior to 10 months. It is their contention that imputing intentionality provides the child with a sense of what is communicative and helps bridge the gap between the prelinguistic and linguistic stages of development. If this is in fact the case, then the adolescent mothers in the present study may be hindering their children's linguistic progress by only responding when the infant initiates.

Insert Slide 10 about here.

In summary, it appears that some infants of adolescent mothers do indeed exist in a less than optimal linguistic environment. The adolescent mothers are less responsive to their infants' behaviors and there are fewer utterances overall. Given the wide standard deviation in virtually every variable measured for both adolescent and older mothers, the conclusion that children of adolescent mothers are at risk for language delay cannot be assumed to pertain to every child of an adolescent mother. Certainly, there are teenage mothers who will be indistinguishable from the average older mother and vice versa.

The results of this study may best be viewed in terms of a communication continuum, from the least rich to the most rich communicative environment provided for a child. Given this, future studies might consider the possibility of a communication threshold. That is, is there a minimal amount of input of a certain type required before a child acquires language at a 'normal' rate. In this regard, data from this study would be most useful in examining the precise role of contingent maternal behavior in the transition from prelinguistic to linguistic communication.

It is possible that the social and communicative envelope provided by the adolescent mother is sufficient to support the acquisition of language at a normal rate. Nonetheless, the present results are consistent with the hypothesis that children of teenage mothers may be at risk for language delay because of a lack of contingency in their mothers' speech.

Slide 1

Purpose and Hypotheses

Purpose: Document differences in maternal input of adolescent and older mothers to their 8 month old infants in three situations.

Hypotheses:

1. Adolescent mothers will use utterances which are grammatically more complex.

2. Adolescent mothers will have fewer utterances per situation.

3. Adolescent mothers will have shorter 'conversational turns'.

4. Adolescent mothers will be less communicatively responsive to their infants' behaviors.

5. These differences will be exacerbated in a teaching situation.

Slide 2

Methodology

Subjects: 20 primiparous, Causasian mothers of healthy, full term infants.

10 adolescents: mean age at birth of child=16.5, range 14 to 17
most had not completed high school
mean SES=26.1, sd=11.56

10 older: mean age at birth of child=24.5, range 21 to 29
most had some post secondary training
mean SES=30.8, sd=3.37

Videotaped in face-to-face interaction, teaching and free play.

Slide 3

Infant Coding Variables

Structural	Discourse
Reach object	Initiate
Reach person	Continues turn
Touch object	Null
Touch person	Respond
Gaze at object	Simultaneous interaction
Gaze at person	Unintentional initiation
Vocalization	
Smile/Laugh	
Cry	
Arms wave/Legs kick	

Slide 4

Maternal Coding Variables

Grammatical Complexity	Discourse
Mean length of utterance	Initiate
Mean length of 5 longest utterances	Continue turn
Number of main verbs	Null
	Respond
	Simultaneous interaction

Slide 5

Mean Values in Maternal Input by Situation

Variable	Face-to-Face	Teaching	Free Play	F	p
MLU	2.74	2.94	2.72	1.29	NS
ML5	7.49	7.32	6.73	1.31	NS
Main Verbs	61.80	76.10	71.55	7.82	.001
Initiation	20.40	31.55	25.90	13.98	.0001
Respond	17.45	11.45	17.05	5.90	.01
Simultaneous	15.40	.20	0.00	17.90	.0001
Contingency	37.75	18.95	30.20	13.62	.0001
Interaction	53.15	19.15	30.20	14.84	.001
# Utterances	81.10	89.00	59.05	5.91	.01
Length of Turn	2.32	2.42	2.59	1.08	NS

Slide 6

Mean Values for Grammatical Complexity Variables
By Maternal Age

Variable	Adolescent	Older	F	p
MLU	2.66	2.93	1.80	NS
ML5	6.49	7.86	5.00	.05
Main Verbs	67.90	71.73	.44	NS

Slide 7

Mean Values for Discourse Variables by Maternal Age

Variable	Adolescent	Older	F	p
Initiations	31.97	19.93	11.16	.001
Respond	13.27	17.37	6.18	.01
Simultaneous	4.00	6.40	.93	NS
Contingency	22.70	35.57	18.66	.001
Interaction	26.37	41.97	14.84	.001
#Utterances	66.10	86.70	5.10	.05
Length of Turn	2.30	2.58	1.49	NS

Slide 8

Stepwise Multiple Regression Analyses of Maternal Input

Variable	Predictor Variables	Multiple R Square	F	p
ML5	Age	12	8.20	.01
Initiation	Age			
	SES			
	Education	41	13.49	.001
Respond	Education	13	8.71	.01
Contingency	Age	94	13.99	.001
Interaction	Age	14	9.41	.01
# Utterances	Age	9	5.73	.05

Slide 9

Imputing Intentionality

Definition: Mother treats an infant behavior as if it were communicative when the child does not have eye contact with the mother.

Age Group	# of Occurances/Situation
Adolescent	7.40
Older	12.46

T=3.82 p<.001

Slide 10

Conclusion

Adolescent mothers are less responsive to their infants' behaviors and use fewer utterances when addressing their infants. These results are consistent with the hypothesis that children of teenage mothers may be at risk for language delay because of this lack of contingency in their mothers' speech.